PRODUCT
Quick Start Guide

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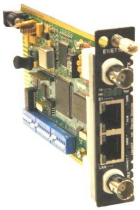
User Guide

Ethernet over E1 LAN Extender

FRM220A-Eoe1



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Introduction

The **FRM220A-Eoe1** is a single port G.703/704 Fractional E1 DSU/CSU card with built-in HDLC Bridge for the FRM220/220A Series Platform Media Converter Rack. The converter supports Unframed, PCM31, and PCM30 framing modes. The clock source may be selected internally or recovered from received E1 signal. The Ethernet port utilizes a single RJ-45 connector. One single model supports either unbalanced 75 ohm with two BNC connectors or balanced 120 ohm with one RJ-45 connector. When the **FRM220A-Eoe1** card is placed in the FRM220 rack with SNMP management, the management can view the converter card's status, type, version, Ethernet link status and alarms. The card can be configured to enable or disable the port, reset the card, set clocking, frame mode and provide analog diagnostic loopbacks. A unique feature of the **FRM220A-Eoe1** is the use of a common card design which may either be inserted in the FRM220-CH01 single slot chassis as a stand-alone modem or as a card when placed in the FRM220-CH20 In-band managed rack.

Features

- Standalone type, 1 port E1 to HDLC converter.
- Uplinks 100M Ethernet to Gigabit trunk card of FRM220A
- Interface connectors, RJ-48C for 120Ω , BNC*2 for 75Ω.
- E1 settings.
  - Line Code HDB3 or AMI.
  - Full or Fractional.
  - Frame setting, E1(CCS/CAS).
  - Idle code setting (0x7E or 0xFF).
- Auto generate (AIS) enable, disable setting.
- Timing source setting (Receive E1 recovery or internal oscillator).
- Active timeslot number setting (E1 CCS 1-31 or E1 CAS 1-30).
- Base timeslot setting (E1 CCS 1-31, E1 CAS 1-15 or 17-31.)
- Loop Back with integral BERT
- LED indicators

Specifications

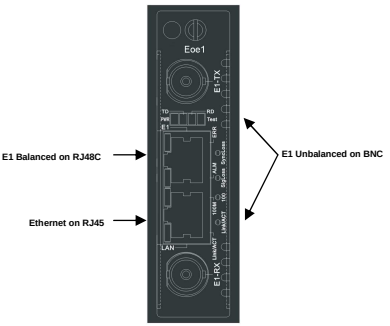
- **G.703 Interface**
- **Connector** 1 x RJ-45 and 2 x BNC
- **Data rate** 2048kb/s
- **Impedance** 75 ohm for unbalanced, 120 ohm for balanced
- **Framing** CCS, CAS, Unframed
- **RxSensitivity** -43dB (extra Long Haul)
- **TxPulseAmp.** 3.00V p-p (120 ohm); 2.73V p-p (75 ohm)
- **Line code** HDB3 or AMI selectable
- **Indications** LED (PWR, TD/RD act., Test, Signal loss, Sync loss, Alarm, Error
- **Ethernet Port** 1 x RJ-45, Auto-Negotiation, Auto-MDIX
- **Power** (Card supports hot-swapping)
- **Input** Card : 12VDC, Standalone : AC, DC options
- **Consumption** <6W
- **Dimensions** 155 x 88 x 23mm (D x W x H)
- **Weight** 120g
- **Temperature** 0 ~ 50℃ (Operating), -10 ~ 70℃ (Storage)
- **Humidity** 10 ~ 90% non-condensing
- **Certification** CE (EMI/LVD), FCC, RoHS
- **MTBF** 75000 hrs (25℃)
- **Tests** (set from console)
- **E1 Loops** Remote and Request Remote Loop back
- **BERT** Integral 511 pattern generator (set from console)

Management Features

The **FRM220-Eoe1** has three on-board 8 pole DIP Switches which can be used to configure the device for stand-alone operation. When placed in a stand-alone chassis with DB9 console port, these devices support a text based serial terminal with an easy to use menu system for configuration. When placed in a managed chassis, all DIP settings are ignored and the card is configured and monitored through the chassis NMC (network management controller) via console, Telnet, Web HTTP or SNMP.

Panel

- Figure 1. Front Panel of FRM220A-Eoe1

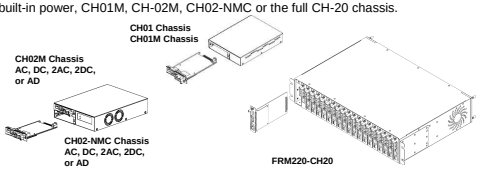


FRM220A-Eoe1

Installation

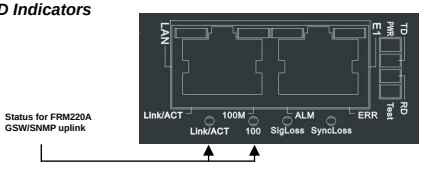
- Figure 2. Slide-in Card mounting of FRM220A-Eoe1

This converter card can be placed in the CH01 with external AC adapter, CH01 w/built-in power, CH01M, CH-02M, CH02-NMC or the full CH-20 chassis.



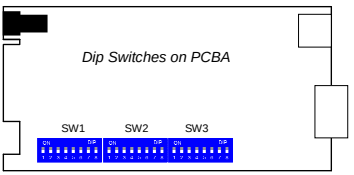
Follow all ESD precautions when handling the card.

LED Indicators



LED		*State*	*Status*
PWR	(Green)	On	Power on
		Flash	During upgrade
		Off	Power off or card disabled
TD	(Green)	On	Data Port TD signal space(0)
		Flash	Data Port TD signal activity
		Off	Data Port TD signal mark(1)
RD	(Green)	On	Data Port RD signal space(0)
		Flash	Data Port RD signal activity
		Off	Data Port RD signal mark(1)
TEST	(Red)	On	Any Test active
		Off	Normal operation
SigLoss	(Red)	On	E1 Signal Loss
		Off	E1 has signal
SyncLoss	(Red)	On	E1 frame sync loss
		Off	E1 framing in sync
ALM	(Red)	On	E1 AIS, RAI, or BPV err
		Off	No E1 Alarms
Error	(Red)	On	Error during BERT
		Off	No error or not running BERT
Link/ACT	(Green)	On	UTP Link is up
		Off	UTP Link is down
100M	(Green)	On	UTP Link Speed is 100M
		Off	UTP Link Speed is 10M
Link/ACT	(Green)	On	FRM220A Switch link up
		Off	FRM220A Switch link down
100M	(Green)	On	FRM220A Switch is 100M
		Off	FRM220A Switch is 10M

DIP Settings



Switch 1 Settings

DIP SW1	SW STATE					Function
	1	2	3	4	5	Fractional timeslot number
	OFF	OFF	OFF	OFF	OFF	Full E1, Unframed mode
	ON	OFF	OFF	OFF	OFF	1 timeslot, 64K
	OFF	ON	OFF	OFF	OFF	2 timeslot, 128K
	ON	ON	OFF	OFF	OFF	3 timeslot, 192K
	OFF	OFF	ON	OFF	OFF	4 timeslot, 256K
	ON	OFF	ON	OFF	OFF	5 timeslot, 320K
	OFF	ON	ON	OFF	OFF	6 timeslot, 384K
	ON	ON	ON	OFF	OFF	7 timeslot, 448K
	OFF	OFF	OFF	ON	OFF	8 timeslot, 512K
	ON	OFF	OFF	ON	OFF	9 timeslot, 576K
	OFF	ON	OFF	ON	OFF	10 timeslot, 640K
	ON	ON	OFF	ON	OFF	11 timeslot, 704K
	OFF	OFF	ON	ON	OFF	12 timeslot, 768K
	ON	OFF	ON	ON	OFF	13 timeslot, 832K
	OFF	ON	ON	ON	OFF	14 timeslot, 896K
1,2,3,4,5	ON	ON	ON	ON	OFF	15 timeslot, 960K
	OFF	OFF	OFF	OFF	ON	16 timeslot, 1024K
	ON	OFF	OFF	OFF	ON	17 timeslot, 1088K
	OFF	ON	OFF	OFF	ON	18 timeslot, 1152K
	ON	ON	OFF	OFF	ON	19 timeslot, 1216K
	OFF	OFF	ON	OFF	ON	20 timeslot, 1280K
	ON	OFF	ON	OFF	ON	21 timeslot, 1344K
	OFF	ON	ON	OFF	ON	22 timeslot, 1408K
	ON	ON	ON	OFF	ON	23 timeslot, 1472K
	OFF	OFF	OFF	ON	ON	24 timeslot, 1536K
	ON	OFF	OFF	ON	ON	25 timeslot, 1600K
	OFF	ON	OFF	ON	ON	26 timeslot, 1664K
	ON	ON	OFF	ON	ON	27 timeslot, 1728K
	OFF	OFF	ON	ON	ON	28 timeslot, 1792K
	ON	OFF	ON	ON	ON	29 timeslot, 1856K
	OFF	ON	ON	ON	ON	30 timeslot, 1920K
	ON	ON	ON	ON	ON	31 timeslot, 1984K (CCS)
6	OFF					E1 Timing source - Recovery
	ON					E1 Timing Source - Internal
7	OFF					E1 Line Code – HDB3
	ON					E1 Line Code - AMI
8	OFF					E1 Impedance – 120 Ohms
	ON					E1 Impedance – 75 Ohms

Switch 2 Settings

DIP SW2	SW STATE					Function
	1	2	3	4	5	Fractional start timeslot setting
1,2,3,4,5	OFF	OFF	OFF	OFF	OFF	Full E1, Unframed mode
	ON	OFF	OFF	OFF	OFF	Timeslot 1
	OFF	ON	OFF	OFF	OFF	Timeslot 2
	ON	ON	OFF	OFF	OFF	Timeslot 3
	OFF	OFF	ON	OFF	OFF	Timeslot 4
	ON	OFF	ON	OFF	OFF	Timeslot 5
	OFF	ON	ON	OFF	OFF	Timeslot 6
	ON	ON	ON	OFF	OFF	Timeslot 7
	OFF	OFF	OFF	ON	OFF	Timeslot 8
	ON	OFF	OFF	ON	OFF	Timeslot 9
	OFF	ON	OFF	ON	OFF	Timeslot 10
	ON	ON	OFF	ON	OFF	Timeslot 11
	OFF	OFF	ON	ON	OFF	Timeslot 12
	ON	OFF	ON	ON	OFF	Timeslot 13
	OFF	ON	ON	ON	OFF	Timeslot 14
	ON	ON	ON	ON	OFF	Timeslot 15
	OFF	OFF	OFF	OFF	ON	Timeslot 16 (cannot set in CAS)
	ON	OFF	OFF	OFF	ON	Timeslot 17
	OFF	ON	OFF	OFF	ON	Timeslot 18
	ON	ON	OFF	OFF	ON	Timeslot 19
	OFF	OFF	ON	OFF	ON	Timeslot 20
	ON	OFF	ON	OFF	ON	Timeslot 21
	OFF	ON	ON	OFF	ON	Timeslot 22
	ON	ON	ON	OFF	ON	Timeslot 23
	OFF	OFF	OFF	ON	ON	Timeslot 24
	ON	OFF	OFF	ON	ON	Timeslot 25
	OFF	ON	OFF	ON	ON	Timeslot 26
	ON	ON	OFF	ON	ON	Timeslot 27
	OFF	OFF	ON	ON	ON	Timeslot 28
	ON	OFF	ON	ON	ON	Timeslot 29
	OFF	ON	ON	ON	ON	Timeslot 30
	ON	ON	ON	ON	ON	Timeslot 31
6,7,8	6					E1 Frame Setting
	OFF					CCS (PCM31)
	ON					CAS (PCM30)
	7					AIS transmit when Rx Signal loss
	OFF					Disable
	ON					Enable
	8					E1 Idle Code Setting
	OFF					0x7E
	ON					0xFF

Notice: All of these settings are ignored if the card is placed in the FRM220A-CH20 with GSW/SNMP or FRM220-CH20 with NMC management. The card will follow the settings done via the chassis management. (Refer to GSW/SNMP operation manual for details on managing all cards.)

Switch 3 Settings

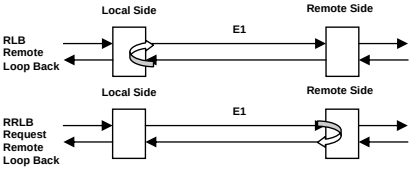
DIP SW3	SW STATE	Function
1	1	IEEE 802.3u Auto-negotiation
	OFF	Auto
	ON	Forced (Manual)
2	2	Forced Speed
	OFF	10M
	ON	100M
3	3	Forced Duplex
	OFF	Half Duplex
	ON	Full Duplex
4	4	IEEE 802.3x Flow Control
	OFF	Enable
	ON	Disable
5-8	Reserved	

Notice: All of these settings are ignored if the card is placed in the FRM220A-CH20 with GSW/SNMP or FRM220-CH20 with NMC management. The card will follow the settings done via the chassis management. (Refer to GSW/SNMP operation manual for details on managing all cards.)

Loop back Test:

This FRM220A-Eoe1 converter incorporates loop back features which allow loop back testing to confirm that the E1 loop is operating normally or not. Since Ethernet is the data port side of this DSU/CSU, loopback cannot be supported. (Ethernet looped would cause a broadcast storm.) Therefore, only loop backs that specifically can test the E1 link are supported in this model.

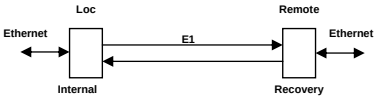
E1 Port Loop Back



Applications

The FRM220A-Eoe1 E1 LAN Bridge DSU/CSU works in point-to-point applications, either as a stand-alone (in CH01, 02, 04) or when placed in the FRM220A-CH20 managed rack.

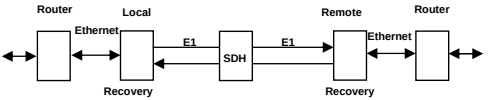
Ethernet over E1



Typical Point-to-Point Application

The E1 transmission signal traditionally has been used to carry voice within the Public Switched Telephone Network. With the emergence of IP, E1 has also found use as a carrier for Data. E1 is able to carry Ethernet data by using HDLC (High-level Data Link Control) WAN encapsulation. The FRM220A-Eoe1 uses an HDLC bridge chip to send the Layer 2 encapsulated synchronous bit stream over the Layer 1 E1 transmission. A carrier can then use this transparent Ethernet to connect to a customer owned broadband router. The FRM220A-Eoe1 supports ISO 13239 standard HDLC encapsulation.

Broadband Router over E1



Deployment in Data Communications Network

Console Management

When placed in the 1-slot CH01M or 2-slot CH02M chassis, this card can be locally managed by connecting a simple serial terminal such as a notebook computer that has an RS232 port or via a commonly available USB to RS232 adapter. In Windows XP, HyperTerminal™ is an application available for emulating a serial terminal. You can also search for TeraTerm or PuTTY which are free alternatives, especially if the operating system is Vista or Win7.

Settings

Baud Rate: 38,400 | Data bits: 8 | Parity bits: none | Stop bits: 1
Handshaking: none | Emulation: VT-100

Connect the serial cable to the DB9. Run the terminal emulation program. With power on, press [ESC] or [Enter] to display the "Main Menu" screen. The following is an example.

```
              ****************************************
              ***    CTC UNION TECHNOLOGIES CO.,LTD   ***
              ***     FRM220 Eoe1 Manager Ver:1.01    ***
              ****************************************
    [Local ]  Version:[1.000-1.001-1.100-0.000]   [CH-01M       ]
<1> Port Active: [Enable ]
    E1 State:              E1 Signal [Loss  ]     E1 Sync [Loss  ]
    LOMF          [No  ]   Receive AIS [No  ]     BERT Error  [No  ]
    Remote Power [OK     ] Line Code Violation [No  ]
    LAN State:
    Link State   [Up  ]    Link Speed  [100M]    Duplex Mode [Full]
<2> E1 Loopback Test:[Off ]
<3> E1 BERT Test:[Disable]
<4> E1 Parameters.
<5> LAN Parameters.
<T> Switch To Remote Tab [No  ]
<R> Port Reset
<S> Store Parameters
<F> Set Factory Default
Please select an item.
```

Example of Main Menu Console Screen, FRM220A-Eoe1

Operation

Select any of the menu items by keying in the menu item number or letter. Use the [ESC] to return to a previous menu. Any setting is immediately applied to the cards circuitry but not saved. After all of the parameter settings have been selected, press "s" from the main menu to save the parameters in non-volatile RAM (NVR). To revert to previous settings before saving, press "r" to reset (reload previously saved parameters).

Explanation of Settings

1. **Port Active** : This menu item can disable or enable the card.
2. **E1 Loopback Test** : The diagnostic loopback for the E1 port is enabled through this menu item.
3. **E1 BERT Test** : This item can enable the integral 511 pattern generator for BER Testing.
4. **E1 Parameters** : This menu provides all of the settings related to the E1 such as frame type, line code and timing setting.
5. **LAN Parameters** : This menu provides all of the settings related to the LAN port such auto, duplex and speed setting.

T. **Switch To Remote Tab** : This converter has the ability to manage the remotely connected Eoe1 by using SA bits. This "out-of-band" remote management means no active timeslot must be dedicated for remote management.

R. **Port Reset** : If changes to the configuration are made, but not saved, this reset function will bring the card back to the previous saved state.

S. **Store Parameters** : Changes are not saved to non-volatile RAM until this save function is performed.

F. **Set Factory Default** : This menu item will return the card to factory default settings.

E1 Parameter Setting

The following screen capture shows the E1 setting items and current values. Choose the menu item and select the desired parameter. To exit press <ESC> and then do not forget to save settings by pressing <s>.

```
              ****************************************
              ***    CTC UNION TECHNOLOGIES CO.,LTD   ***
              ***     FRM220 EoE1 Manager Ver:1.01    ***
              ****************************************
    [Local ]  Version:[1.000-1.001-1.100-0.000]   [CH-01M       ]
E1 Parameter Setting:
<1> Line Code            [HDB3]
<2> Timing Source        [Internal]
<3> Line Impedance       [120 ohms]
<4> Idle Code            [7E H]
<5> Auto Transmitted AIS [Disable]
<6> Frame Mode           [Framed  ]
<7> Frame Format         [CCS ]
<8> Time Slot Setting:
    [-] 0   [v] 1   [v] 2   [v] 3   [v] 4   [v] 5   [v] 6   [v] 7
    [v] 8   [v] 9   [v]10   [v]11   [v]12   [v]13   [v]14   [v]15
    [v]16   [v]17   [v]18   [v]19   [v]20   [v]21   [v]22   [v]23
    [v]24   [v]25   [v]26   [v]27   [v]28   [v]29   [v]30   [v]31
<ESC> Go to previous menu. Please select an item.
```

Ethernet Port Parameter Setting

The following screen capture shows the Ethernet port setting items and current values. Choose the menu item and select the desired parameter. To exit press <ESC> and then do not forget to save settings by pressing <s>.

```
              ****************************************
              ***    CTC UNION TECHNOLOGIES CO.,LTD   ***
              ***     FRM220 EoE1 Manager Ver:1.01    ***
              ****************************************
    [Local ]  Version:[1.000-1.010-1.100-0.000]   [CH-01M       ]
LAN Parameter Setting:
<1> LAN 1 Negotiation  [Auto  ]
<2> LAN 1 Speed        [100M]
<3> LAN 1 Duplex       [Full]
<4> LAN 1 Flow Control [Enable ]
<ESC> Go to previous menu. Please select an item.
```


Upgrading

The **FRM220A-EoE1** card may be firmware upgraded when it is placed in the FRM220(A) with management card. The user may use a local console connection to the NMC, a remote Telnet (IP) connection, or a Web based (HTTP) connection with any available browser. The NMC communicates to all cards through a serial RS485 control bus. The upgrade code is transferred to the NMC by way of TFTP server.

Quick Procedure

Place the line card's upgrade code on the TFTP server. Make sure you know the case sensitive file name. Connect to the FRM220-NMC by local console or by remote Telnet connection. From the main menu choose:

<L> SNMP System Configuration Setup

Then:

<U> Upgrade Line Card Menu

```
              ****************************************
              *** CTC UNION TECHNOLOGIES CO., LTD. ***
              ****************************************
                     << Upgrade Line Card Menu >>
          Target IP        : 59.125.162.252
          Target Gateway   : 59.125.162.241
          TFTP Server IP   : 59.125.162.243

  Please select a card type:
  <1> : 10/100I and FMC-10/100I    <3> : SERIAL
  <2> : FXO/FXS                    <4> : 155MS
  <5> : DATAPORT                   <6> : E1/T1
  <7> : 1000EDS/1000ES-2F          <8> : 1000ES-1/1000E-1/1000E-2F
  <9> : 10/100IS-2                 <A> : 1000TS/1000T
  <B> : 3R-2.7G-2S/3S              <C> : 5E1/ET100T
  <D> : 5E1/ET100S                 <E> : Eoe1
  <F> : 3R-10G/SS/SX/XX            <G> : 3R-10G/SS/SX/XX CDR
 <ESC>: Previous Menu
  The card type = FRM220-Eoe1
  Please enter the slot number '2'~'20' or 'all': 9
  The slot number = 9
  Please select <1>: Local <2>: Remote Unit <3>: Remote B Unit
             <ESC>: Previous menu.
```

Select the line card type 'E' (EOE1) and local unit. Enter filename.

The upgrade should complete in only a couple of minutes. DO NOT disconnect or pullout/insert any other cards during the upgrade process.